



Air Quality Monitoring Report

Ontario 1971

Vol. 1

TD
883.7
.057
A37
1971
vol 1
MOE

SO₂ in downtown Toronto

SO₂ (ppm)

1966 1967 1968 1969 1970 1971 1972 1973 1974

·09

·08

·07

·06

·05

·04

·03

·02



TD
883.7
.057
A37
1971
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Continuous Air Monitoring Station at Toronto's Science Centre is a working model on display to the public.

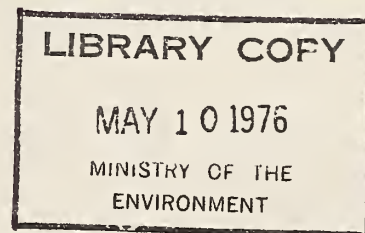
Air Quality Monitoring Report

Ontario 1971

Vol. 1



Ontario



Ministry of the Environment

Hon. J.A.C. Auld
Minister

Everett Biggs
Deputy Minister

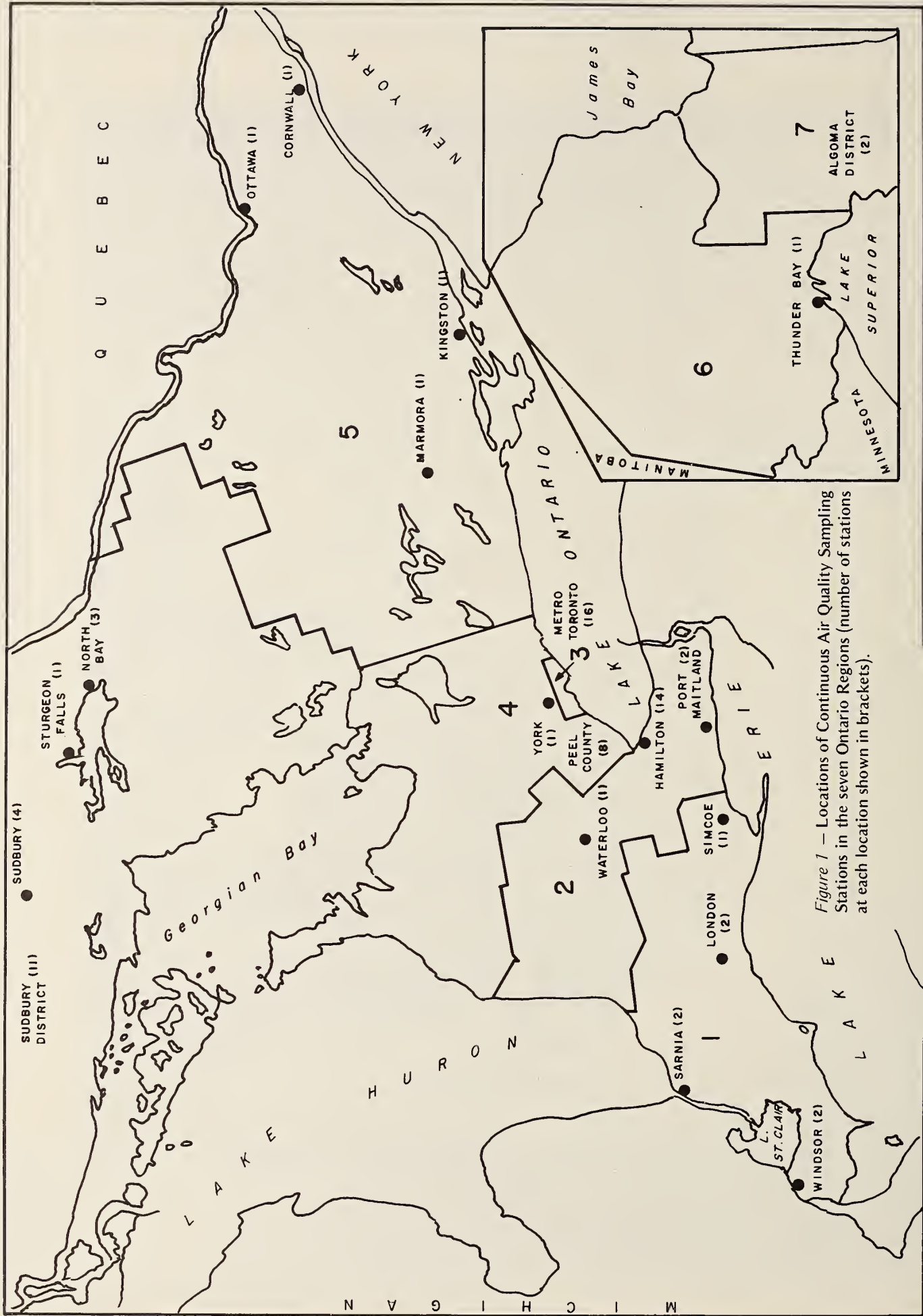


Figure 1 — Locations of Continuous Air Quality Sampling Stations in the seven Ontario Regions (number of stations at each location shown in brackets).

Introduction

The air sampling program of the Province of Ontario provides a large amount of air quality data gathered by means of an extensive continuously monitored network of 76 sampling stations located throughout Ontario.

Readouts for 1971 are published in four volumes. Volume 1 provides a summary of all data obtained. Volumes 2-4 list details of the hourly data for each station — Vol. 2 for sulphur dioxide, Vol. 3 for suspended particulate matter in terms of the soiling index (COH), and Vol. 4 for total oxidants, nitrogen oxide, carbon monoxide, and total hydrocarbons.

Sampling Stations

The presence of air pollution implies three distinct components: a source, a receptor, and transport of pollutants from source to receptor. The choice of sampling sites is determined therefore by population densities, land use, pollution sources, topography, and meteorology.

Table 1 lists the sites equipped with continuous sampling instrumentation. The seventy-six stations are distributed across the entire province. All the large cities and areas where problems have been identified are represented.

Fig. 1 shows the locations of the cities monitored. The locations of the network of stations in Metropolitan Toronto, Hamilton and the Sudbury Basin are shown in Figures 2, 3 and 4.

The table indicates the administrative region for each station, station identification number, street address and city, bearings on the Universal Transverse Mercator Grid, elevation above mean sea level and height of the sampling intake above ground. The grid bearings and elevation fix the location of the station in space within a one-tenth kilometre square. This information is essential to validate mathematical models being developed for Toronto, Hamilton and other areas.

Continuous sampling was carried out on five gaseous contaminants in air: sulphur dioxide (SO_2), total oxidants (Ox), nitrogen oxides (NO_x), carbon monoxide (CO) and total hydrocarbons (HC). Concentrations are recorded continuously on charts at the sampling stations. At stations which telemeter data directly to the central station in Toronto, analogue data from charts are converted to digital data, recorded on magnetic tape, and computer processed as hourly data. For the majority of stations, however, hourly averages are abstracted manually from charts and processes to produce the computer print-out.

Suspended particulate matter in the air in the size range corresponding approximately to the respirable size range are collected continuously on tapes as one or two-hour samples. They are evaluated optically as a soiling index in units of COH (Coefficient of haze) per 1,000 feet

of air drawn through the filter tape, and these appear in the computer print-out as hourly or two-hourly data.

Criteria for Desirable Ambient Air Quality

For assessment of ambient air quality, Schedule 2 of the Ontario Revised Regulations 15RRO/1970 states air quality criteria representing desirable air quality objectives to be met in Ontario. Table 2 gives these objectives for varying averaging times for the pollutants monitored, except total hydrocarbons for which criteria have not been established.

The ambient air quality objectives are not static, but are changed as research produces more information regarding the effects of each of the pollutants.

Summary of 1971 Measurements

In a 12-month period of continuous sampling and 100% valid data, as many as 8,760 data points are available for each contaminant for each station. In the summaries this information is reduced to a single line of data.

For example, for the first station listed under the table for 'sulphur dioxide' (471 University Avenue, Windsor) the number of months of data, the percentiles, the arithmetic mean, the maximum one-hour and 24-hour values, and the number of times Ontario criteria for different sampling times were exceeded are given. The percentiles indicate the distribution of concentrations measured: (e.g.) 10% below .004 ppm, 50% below .021 ppm, and 99% below .274 ppm.

These statistics, describing the air quality regarding any contaminant at a station, may be used for comparison of air quality at locations both within and outside Ontario where similar measuring techniques and statistics are available. The percentiles may also be used to estimate the reduction required to meet set goals in ambient air quality.

Analyses of Data

Sulphur Dioxide (*See Table 3*)

Sulphur occurs in most fossil fuels and in combination with metals in mineral deposits. On combustion it is readily oxidized to sulphur dioxide. Because of its adverse effects on vegetation and suspected effects on health in the presence of particulate matter it has received considerable attention in most industrialized countries.

This is reflected in Ontario's continuous sampling program — approximately a third of the instrumentation is devoted to sulphur dioxide, a third to particulate matter, and the remaining third to oxidants, nitrogen oxides, carbon monoxide, and hydrocarbons.

Three criteria for desirable air quality are

annual average	— 0.02 ppm
24-hour average	— 0.10 ppm
1 hour average	— 0.25 ppm

Of the 51 stations monitoring sulphur dioxide, only eight stations met all of the criteria. They were in London, Simcoe, Waterloo, Hamilton, Etobicoke, Peel County, Ottawa and a station in the Sudbury airshed named St. Charles.

Maximum values for all three sampling times were recorded at Happy Valley near Falconbridge:

annual average	— 0.065 ppm
24-hour average	— 0.70 ppm
and 1 hour average	— 4.00 ppm

Suspended Particulate Matter (*See Table 4*)

Particulate matter is a contaminant produced by nearly all combustion and industrial processes. Heavy industry and incinerators are major sources. The wind and traffic disperse particulates continuously in the atmosphere of urban areas. Because of its effects on visibility and soiling it is more closely identified as pollution by the public than any other contaminant.

Ontario criterion for a 24-hour average soiling index of 1.0 COH/1,000 ft was met at 17 of the 50 stations. These stations also met the 1 year average criterion 0.45 COH/1,000 ft.

Of the 10 stations which did not meet the 1-year average criterion, one was in Metro Toronto (67 College Street) 7 were in Hamilton, and 2 in Windsor. The maximum 24-hour average of 2.5 COH/1,000 ft. and the maximum 1-year average of 0.67 COH/1,000 ft were obtained at Barton-Wentworth, Hamilton.

Total Oxidants (*See Table 5*)

The sampling method does not distinguish between the various oxidizing agents present in the atmosphere, although it is known that 80-90% of the oxidants are normally ozone.

In the upper atmosphere much of the ozone is formed by the action of ultraviolet radiation on oxygen. Near the earth's surface ozone is mainly produced photochemically by the reaction of nitrogen oxides and hydrocarbons in sunlight.

Ontario's criteria, 0.10 ppm for 1 hour and 0.03 ppm for 24 hour averages, were exceeded at all stations. The highest 1 hour maximum of 0.35 ppm was measured at Elmcrest Road, Etobicoke, the highest 24 hour maximum of 0.12 ppm at Memorial Park, Cornwall, and the highest annual average of 0.042 ppm at Barton-Wentworth, Hamilton.

Total oxidants measured in Ontario are well below those which occur in such places as Los Angeles, where this contaminant is the major pollutant. An alert situation is considered to occur at 0.4 ppm, a level not yet measured in Ontario.

Nitrogen Oxides (*See Table 6*)

Most of the nitrogen oxides in the atmosphere are formed by high temperature combustion processes as, for example, in power plants and automobiles. Nitrogen and oxygen are the main constituents of the air, and at high temperatures they combine to form nitric oxide which oxidizes under sunlight to nitrogen dioxide.

In 1971 the instruments monitored both nitric oxide and nitrogen dioxide and reported these as NO_x or nitrogen oxides. Ontario criteria are given for NO_x, although harmful effects at the criteria levels are correct for nitrogen dioxide only. Nitric oxide itself is not as toxic and much higher concentrations than those which normally occur in the atmosphere would be required to produce a harmful effect.

The Ontario criteria, 1-hour average time 0.20 ppm, and 24-hour average time 0.10 ppm, were exceeded at 8 of the 12 stations. The maximum 24-hour average, .32 ppm, and the maximum 1 hour average, .76 ppm, were recorded at Bathurst-Wilson, North York.

Carbon Monoxide (*See Table 7*)

Carbon monoxide occurs in higher concentrations in the ambient air than any other gaseous contaminant. It has recently been shown that natural processes account for a large part of the carbon monoxide in the global atmosphere. However, automotive sources are the main contributor to the ground level concentrations obtained at sampling stations.

It is estimated that approximately 50% of the total weight of contaminants in Toronto consist of carbon monoxide, all but a small fraction emitted by automobile traffic. It is therefore not surprising that the highest concentrations are measured at downtown stations and at stations near expressways.

The Ontario criterion for a 1-hour average of 40 ppm was not exceeded at any of the 16 stations, with the maximum 1-hour average of 25 ppm recorded at Bathurst-Wilson, North York. The criterion for the 24-hour average of 8 ppm was exceeded at 11 stations, with the maximum value of 16 ppm measured at Evans-Arnold, Etobicoke. The criterion for the 8-hour average of 15 ppm was exceeded at one station in Windsor, and four stations in Metropolitan Toronto.

Total Hydrocarbons (*See Table 8*)

Natural sources of hydrocarbons are trees, shrubs, and decaying vegetation. It is estimated that background levels, even in cities, are approximately 1.5 ppm. Automobiles, storage tanks, solvents used in printing and dry cleaning are the main man-made sources in cities.

Since only a small fraction of the total hydrocarbons

measured by instruments currently in use are known to be 'reactive', no criteria can be set which by comparison would indicate the magnitude of the problem.

The highest 1-year average of 2.5 ppm was recorded at Sarnia, the maximum 24-hour average of 6.0 ppm at Windsor, and the maximum 1-hour average of 19.0 ppm at Sarnia.

Ontario's Air Pollution Index

An Air Pollution Index has been designed for Ontario cities, based on concentrations of sulphur dioxide and suspended particulate matter. The index is computed hourly and publicized four times daily.

When the index reaches 32 and poor dispersion weather is forecast for 6 or more hours, the owners of the principal sources of pollutants are advised to prepare for curtailment of operation. At the Air Pollutant Alert Level of 50, if poor dispersion is expected to persist for 6 or more hours, the owners of sources may be ordered to curtail their emissions.

During 1970 the Air Pollution Index was established for Toronto and Hamilton, and during 1971 for Sudbury, Windsor, and Happy Valley near Falconbridge. (For a summary of the data for the two years see table on this page.)

The frequency of the occasions on which a high index occurs during the course of a year depends on emissions and the number of times that meteorological conditions exist which are conducive to poor dispersion over prolonged periods. The abatement of emissions of pollutants into the atmosphere should result in a decreasing frequency of high index occasions.

Summary — Air Pollution Index 1970 and 1971

1. Toronto — started March 23, 1970
2. Hamilton — started June 15, 1970
3. Sudbury — started January 16, 1971
4. Windsor — started March 19, 1971
5. Happy Valley — started May 13, 1971

Number of occasions ≥ 32 and ≥ 50 in 1970

CITY	≥ 32	≥ 50	MAXIMUM WITH DATE
Toronto	17	2	56 — October 8
Hamilton	7	1	56 — October 8

Number of occasions ≥ 32 and ≥ 50 in 1971

CITY	≥ 32	≥ 50	MAXIMUM WITH DATE
Toronto	19	1	52 — April 13
Hamilton	23	Nil	48 — October 21
Sudbury	26	3	87 — December 11
Windsor	2	Nil	33 — November 10
Happy Valley	20	7	64 — November 21



Air Management Branch technician checks high volume filters measuring total suspended particulate matter (above), and sulphation candle (below). Both installations are on College Street, in downtown Toronto.



Tables

Table 1/1971 Stations With Continuous Sampling Instrumentation
(Pollutant data Abstracted hourly or two-hourly)

REGION	STATION NUMBER	NAME OF STATION	INTERNATIONAL GRID		SITE ELEVATION ABOVE MEAN SEA LEVEL (FT)	AIR INTAKE ABOVE GROUND (FT)	POLLUTANT MONITORED					
			EASTING	NORTHING			SO ₂	COH	O _x	NO _x	CO	HC
1	12008	471 University Ave., Windsor	03316	46867	600	25	x	x	x	x	x	x
	12032	Morton Dock, Windsor	03271	46817	580	12	x	x				
	14016	Meteorological Tower, Courtright	03793	47397	590	12	x					
	14049	156 Victoria St., Sarnia	03854	47585	600	12	x	x	x	x	x	x
	15001	King-Rectory, London	04818	47595	850	13	x	x	x	x	x	x
	15003	362 Dundas St., London	04801	47590	825	55		x				
	16001	Horticultural Station, Simcoe	05555	47441	750	10	x			x	x	x
2	22011	Deamude, Port Maitland	06185	47499	580	7	x					
	22012	Reeve's House, Port Maitland	06184	47468	580	6	x					
	26001	Public Utilities Sub-station, Waterloo	05356	48132	1100	8	x	x				
	29001	Hughson-Main, Hamilton	05919	47896	325	30			x			
	29004	Scott Park, Hamilton	05949	47889	275	10			x			
	29008	North Park, Hamilton	05984	47927	260	10	x	x				
	29009	Kenilworth-Roxborough, Hamilton	05967	47884	300	30			x			
	29012	Burlington-Wellington, Hamilton	05931	47914	275	12			x			
	29013	John-Burlington, Hamilton	05926	47914	275	6			x			
	29014	Elgin-Barton, Hamilton	05926	47904	275	15			x			
	29015	Merrick St., Hamilton	05917	47900	300	55			x			
	29017	Chatham-Frid, Hamilton	05898	47896	325	15			x			
	29025	Barton-Wentworth, Hamilton	05939	47900	300	12	x	x	x		x	x
	29026	Woodward-Brampton, Hamilton	05996	47897	275	13	x	x				
	29057	544 Main St., Hamilton	05940	47888	300	20			x			
	29058	Skyway Toll Booth, Hamilton	05986	47919	250	3			x			
	29063	1031 Barton E., Hamilton	05960	47892	280	40			x			
3	31001	67 College St., (5th Floor), Toronto	06300	48352	340	65	x	x	x	x	x	x
	31002	150 College St., University of Toronto	06296	48351	340	40	x	x				
	31003	City Hall, Toronto	06304	48342	295	100	x	x				
	31016	1 Leslie St., Toronto	06348	48353	260	15	x					
	31026	360 Christie St., Toronto	06272	48367	412	20			x			

Table 1/71 – Continued

REGION	STATION NUMBER	NAME OF STATION	INTERNATIONAL GRID		SITE ELEVATION ABOVE MEAN SEA LEVEL (FT)	AIR INTAKE ABOVE GROUND (FT)	POLLUTANT MONITORED					
			EASTING	NORTHING			SO ₂	COH	O _x	NO _x	CO	HC
4	31081	67 College St., (1st Floor), Toronto	06300	48352	340	8	x				x	x
	33002	Pharmacy-Hwy. 401, Scarborough	06357	48473	575	8	x	x		x		x
	33003	Lawrence-Kennedy, Scarborough	06389	48452	550	10	x	x			x	x
	33019	Redland Cresc., Scarborough	06422	48411	500	10	x	x				
	34002	Science Centre, Don Mills, North York	06338	48419	350	30	x	x	x	x	x	x
	34007	Bathurst-Wilson, North York	06261	48437	700	8	x	x		x	x	x
	35003	Elmcrest Rd., Etobicoke	06142	48338	500	12	x	x	x	x	x	x
	35005	Queensway Hospital, Etobicoke	06159	48293	350	30	x	x				
	35008	22 - 36th St., Etobicoke	06190	48281	300	5		x				
	35033	Evans-Arnold, Etobicoke	06192	48302	350	9	x	x			x	x
	35036	Islington-Hwy. 401, Etobicoke	06169	48404	500	35	x	x				
	46001	Toronto Airport, Peel County	06087	48342	550	6		x				
	46025	Mississauga Library, Peel County	06116	48260	375	15		x				
	46033	Fire Hall, Bramalea, Peel County	06046	48402	650	12		x				
	46038	Old Court House, Brampton, Peel County	06001	48375	700	25		x				
	46071	O.P.P., QEW-Hwy. 10, Peel County	06133	48247	325	20	x					
	46244	W 34, Lakeview G.S., Peel County	06116	48245	325	15	x					
	46253	W 42, Lakeview G.S., Peel County	06104	48245	425	15	x					
	46254	W 50, Lakeview G.S., Peel County	06088	48243	475	15	x					
	48001	Hwy. 7-Hwy. 400, York County	06176	48495	650	10	x	x				x
5	51001	MacDonald Gardens, Ottawa	04471	50312	200	12	x	x	x	x	x	
	52015	797 Princess St., Kingston	03797	48993	350	30		x				
	54001	78 Bursthall St., Marmora	02873	49284	600	12	x					
	56051	Memorial Park, Cornwall	05208	49846	200	12	x	x	x	x	x	
	63015	1111 Victoria Ave., Thunder Bay	03331	53614	650	4		x				
7	71001	Wawa, Algoma District	06645	53195	—	10	x					
	71002	Goudreau, Algoma District	06834	53483	—	10	x					
	71021	Provincial Building, Sault Ste. Marie	07049	51542	625	40		x				
	75017	Cache Bay, Sturgeon Falls	05788	51380	680	5	x					
	75018	649 Cassells St., North Bay	06184	51298	675	18		x				
	75019	Walkers Store, North Bay	06185	51297	675	10		x				
	75020	Teachers' College, North Bay	06185	51297	675	10		x				
	77001	Penage, Sudbury District	04730	51250	850	10	x					

Table 1/1971 — Continued

REGION	STATION NUMBER	NAME OF STATION	INTERNATIONAL GRID		SITE ELEVATION ABOVE MEAN SEA LEVEL (FT)	AIR INTAKE ABOVE GROUND (FT)	POLLUTANT MONITORED					
			EASTING	NORTHING			SO ₂	COH	O _x	NO _x	CO	HC
	77005	394 Montague Avenue, Sudbury	04995	51497	950	8	x					
	77009	Burwash, Sudbury District	05144	51228	750	10	x					
	77010	Callum, Sudbury District	05270	51525	850	10	x					
	77012	Skead, Sudbury District	05186	51678	900	10	x					
	77014	Rayside, Sudbury District	04930	51600	850	10	x					
	77015	Garson, Sudbury District	05110	51567	950	10	x					
	77016	Ash St. Water Tank, Sudbury	04994	51486	950	10	x	x	x	x	x	x
	77017	Morgan, Sudbury District	04810	51637	900	10	x					
	77018	St. Charles, Sudbury District	05449	51343	750	10	x					
	77019	Grassy Lake, Sudbury District	05536	51854	850	10	x					
	77020	50 Cedar St., Sudbury	05005	51485	900	10		x				
	77022	Kukagami Lake, Sudbury District	05327	51744	950	10	x					
	77023	Happy Valley, Falconbridge	05146	51564	950	10	x	x				
	77024	765 Barry Downe Rd., Sudbury	05042	51516	850	10	x					

Air Management's Computer Centre at the Branch's Bay St. offices in Toronto processes telemetered data from sampling stations throughout Ontario, computes 1-hour and 24-hour averages for the Air Pollution Index, and provides a continuous printout.

Table 2/1971

Criteria For Desirable Ambient Air Quality*

NAME OF CONTAMINANT	UNITS OF MEASURE	AVERAGING TIME	CONCENTRATION
Sulphur Dioxide	Parts per million	1 hour	.25
		24 hours	.10
		1 year	.02
Oxidants	Parts per million	1 hour	.10
		24 hours	.03
Nitrogen Oxides	Parts per million	1 hour	.20
		24 hours	.10
Carbon Monoxide	Parts per million	1 hour	.40
		8 hours	.15
		24 hours	.08
Suspended Particulate (Soiling Index)	COH per 1,000 feet of air	24 hours	1.0
		1 year	.45

*15 R.R.O. 1970



Table 3/1971 Summary of Data: Sulphur Dioxide (in ppm)

REGION	STATION NUMBER	LOCATION	NO. OF MONTHS	PERCENTILES						ARITH-METIC MEAN	NUMBER OF TIMES ABOVE CRITERIA				
				10	30	50	70	90	99		MAXIMUM 1-HR.	24-HR.	1-HR.	24-HR.	1-YR.
1	12008	471 University Ave., Windsor	12	.004	.011	.021	.037	.087	.274	.042	.60	.20	118	15	1
	12032	Morton Dock, Windsor	12	.001	.004	.007	.012	.035	.106	.015	.33	.14	7	1	Nil
	14016	Met. Tower, Courtright	12	.002	.005	.009	.017	.040	.128	.021	.83	.13	11	1	1
	14049	Victoria St., Sarnia	12	.002	.006	.009	.020	.064	.194	.026	.59	.14	44	9	1
	15001	King-Rectory, London	9	.002	.005	.009	.017	.029	.048	.015	.09	.05	Nil	Nil	Nil
	16001	Hort. Station, Simcoe	10	.002	.005	.008	.012	.023	.054	.012	.11	.07	Nil	Nil	Nil
2	22011	Deamude, Port Maitland	9	.002	.006	.009	.016	.031	.111	.019	.39	.05	4	Nil	Nil
	22012	Reeve's House, Port Maitland	12	.002	.007	.013	.022	.048	.173	.024	.58	.15	21	1	1
	26001	P.U. Sub-Station, Waterloo	7	.002	.006	.009	.017	.030	.049	.016	.08	.04	Nil	Nil	Nil
	29008	North Park, Hamilton	8	.002	.005	.008	.012	.031	.066	.013	.12	.07	Nil	Nil	Nil
	29025	Barton-Wentworth, Hamilton	12	.003	.008	.016	.030	.063	.130	.029	.31	.16	6	2	1
	29026	Woodward-Brampton, Hamilton	6	.003	.011	.021	.031	.048	.081	.028	.19	.08	Nil	Nil	1
3	31001	67 College St., 5th Fl., Toronto	12	.007	.021	.034	.052	.101	.254	.052	.54	.25	93	33	1
	31002	Univ. of Toronto, Toronto	10	.011	.019	.028	.040	.067	.129	.040	.35	.10	4	Nil	1
	31003	City Hall, Toronto	9	.003	.010	.021	.045	.097	.204	.041	.60	.19	17	8	1
	31016	1 Leslie St., Toronto	12	.004	.018	.030	.043	.076	.188	.042	1.01	.22	29	8	1
	31081	67 College St., 1st. Fl., Toronto	11	.003	.009	.020	.040	.084	.199	.038	.54	.18	17	7	1
	33002	Pharmacy-Hwy. 401, Scarborough	7	.003	.008	.013	.019	.034	.070	.021	.14	.08	Nil	Nil	1
	33003	Lawrence-Kennedy, Scarborough	9	.002	.005	.009	.016	.036	.086	.017	.32	.08	1	Nil	Nil
	33019	Redland Cres., Scarborough	12	.002	.007	.012	.022	.045	.104	.023	.21	.08	Nil	Nil	1
	34002	Science Centre, North York	9	.001	.004	.007	.012	.027	.068	.029	.29	.08	1	Nil	1
	34007	Bathurst-Wilson, North York	10	.003	.008	.015	.024	.049	.136	.026	.49	.16	5	1	1
	35003	Elmcrest Road., Etobicoke	12	.002	.005	.008	.014	.034	.096	.015	.32	.06	3	Nil	Nil
	35005	Queensway Hosp., Etobicoke	7	.002	.006	.010	.019	.043	.121	.021	.45	.13	8	1	1
	35033	Evans-Arnold., Etobicoke	8	.003	.010	.020	.032	.067	.144	.033	.31	.11	5	2	1
	35036	Islington-Hwy. 401, Etobicoke	10	.002	.005	.008	.016	.036	.086	.017	.24	.07	Nil	Nil	Nil
4	46071	QEW-Hwy. 10, Peel County	4	.002	.005	.009	.018	.036	.089	.018	.20	.05	Nil	Nil	Nil
	46244	W34 Lakeview G.S., Peel County	12	.002	.006	.011	.023	.040	.090	.022	.42	.09	5	Nil	1
	46253	W42 Lakeview G.S., Peel County	12	.003	.008	.018	.028	.048	.135	.028	.46	.13	21	2	1
	46254	W50 Lakeview G.S., Peel County	12	.002	.007	.013	.023	.038	.079	.021	.35	.10	6	Nil	1
	48001	Hwy. 7-Hwy. 400, York County	8	.003	.008	.015	.024	.043	.093	.025	.33	.12	5	1	1
5	51001	MacDonald Gardens, Ottawa	10	.001	.004	.007	.009	.018	.040	.010	.12	.04	Nil	Nil	Nil
	54001	78 Bursthall, Marmora	6	.001	.004	.007	.012	.039	.397	.025	1.31	.51	55	5	1
	56051	Memorial Park, Cornwall	11	.002	.007	.014	.033	.096	.351	.041	.96	.22	95	9	1

Table 3/1971 – Continued

REGION	STATION NUMBER	LOCATION	NO. OF MONTHS	PERCENTILES						ARITH-METIC MEAN	MAXIMUM		NUMBER OF TIMES ABOVE CRITERIA		
				10	30	50	70	90	99		1-HR.	24-HR.	1-HR.	24-HR.	1-YR.
7	71001	Wawa	5	.001	.003	.005	.007	.009	.123	.005	1.74	.09	16	Nil	Nil
	71002	Goudreau, Algoma	5	.001	.003	.006	.008	.010	.174	.009	.33	.06	6	Nil	Nil
	75017	Cache Bay, Sturgeon Falls	10	.001	.003	.005	.007	.009	.063	.003	.35	.10	6	Nil	Nil
	77001	Penage, Sudbury District	6	.001	.003	.005	.007	.010	.210	.007	.84	.16	28	2	Nil
	77005	394 Montague St., Sudbury	8	.001	.004	.007	.010	.052	.267	.022	1.20	.16	54	4	1
	77009	Burwash, Sudbury District	7	.001	.003	.005	.008	.010	.135	.006	.55	.09	12	Nil	Nil
	77010	Callum, Sudbury District	6	.001	.003	.006	.008	.023	.257	.013	.69	.13	38	1	Nil
	77012	Skead, Sudbury District	7	.001	.004	.007	.010	.154	.509	.045	1.62	.28	242	25	1
	77014	Rayside, Sudbury District	7	.001	.003	.005	.008	.010	.284	.011	1.24	.20	45	3	Nil
	77015	Garson, Sudbury District	6	.001	.004	.006	.009	.086	.508	.031	1.01	.23	138	10	1
	77016	Ash St., Sudbury	12	.002	.007	.014	.032	.122	.567	.053	1.84	.50	377	48	1
	77017	Morgan, Sudbury District	6	.001	.003	.005	.007	.010	.150	.006	.60	.08	21	Nil	Nil
	77018	St. Charles, Sudbury District	6	.001	.003	.005	.007	.009	.049	.002	.18	.02	Nil	Nil	Nil
	77019	Grassy Lake, Sudbury District	5	.001	.003	.005	.008	.010	.110	.005	.29	.05	1	Nil	Nil
	77022	Kukagami Lake, Sudbury District	5	.001	.004	.006	.008	.038	.338	.020	1.01	.16	50	5	Nil
	77023	Happy Valley, Falconbridge	11	.003	.008	.021	.049	.154	.623	.065	4.00	.70	387	50	1
	77024	Barry Downe Road, Sudbury	4	.002	.006	.012	.032	.117	.579	.051	1.44	.23	97	10	1

Table 4/1971 Summary of Data: Soiling Index (in COH/1,000 linear feet)

REGION	STATION NUMBER	LOCATION	NO. OF MONTHS	PERCENTILES						ARITH-METIC MEAN	MAXIMUM		NUMBER OF TIMES ABOVE CRITERIA		
				10	30	50	70	90	99		1-HR.	24-HR.	24-HR.	1-YR.	
1	12008	471 University Ave., Windsor	12	.16	.32	.46	.64	.98	1.80	0.58	3.7	1.5	12	1	
	12032	Morton Dock, Windsor	9	.12	.27	.40	.57	.99	1.99	0.54	5.0	1.3	9	1	
	14049	156 Victoria St., Sarnia	12	.05	.13	.22	.38	.69	1.27	.034	5.0	1.0	Nil	Nil	
	15001	King-Rectory, London	12	.02	.07	.13	.20	.44	.88	0.21	1.3	0.8	Nil	Nil	
	15003	362 Dundas St., London	11	.03	.10	.17	.28	.53	1.07	0.27	1.9	0.8	Nil	Nil	
2	26001	P.U. Sub-station, Waterloo	12	.03	.09	.15	.23	.46	1.03	0.23	2.8	1.2	1	Nil	
	29001	Hughson-Main, Hamilton	12	.07	.17	.29	.49	.99	2.02	0.48	3.1	2.3	19	1	
	29004	Scott Park, Hamilton	11	.03	.09	.16	.24	.44	.84	0.23	1.6	0.6	Nil	Nil	
	29008	North Park, Hamilton	12	.06	.17	.34	.63	1.08	1.76	0.51	2.6	1.5	29	1	
	29009	Kenilworth, Hamilton	11	.04	.11	.18	.29	.60	1.40	0.30	2.2	1.2	1	Nil	
	29012	Burlington-Wellington, Hamilton	12	.03	.08	.15	.24	.53	1.30	0.25	4.6	1.8	3	Nil	
	29013	Burlington-John, Hamilton	10	.03	.09	.14	.21	.41	.98	0.22	2.6	1.4	1	Nil	

Table 4/1971 – *Continued*

REGION	STATION NUMBER	LOCATION	NO. OF MONTHS	PERCENTILES						ARITH- METIC MEAN	MAXIMUM		NUMBER OF TIMES ABOVE CRITERIA	
				10	30	50	70	90	99		1-HR.	24-HR.	24-HR.	1-YR.
3	29014	Elgin-Barton, Hamilton	11	.07	.19	.32	.53	.97	1.80	0.48	4.4	1.9	7	1
	29015	Merrick, Hamilton	10	.08	.19	.33	.57	1.05	1.88	0.51	3.7	1.8	12	1
	29017	Chatham-Frid, Hamilton	12	.04	.11	.18	.31	.67	1.43	0.32	3.1	1.7	3	Nil
	29025	Barton-Wentworth, Hamilton	12	.16	.32	.48	.71	1.27	2.43	0.67	4.3	2.5	51	1
	29026	Woodward-Brampton, Hamilton	8	.06	.15	.24	.39	.68	1.35	0.37	6.0	1.2	1	Nil
	29057	554 Main St. E., Hamilton	12	.06	.17	.29	.53	1.08	2.26	0.51	3.1	2.2	19	1
	29058	Skyway Toll, Hamilton	12	.04	.13	.24	.48	1.04	2.02	0.45	7.1	2.0	18	Nil
	29063	1031 Barton E., Hamilton	11	.09	.18	.32	.53	.94	1.68	0.48	2.8	1.3	4	1
	31001	67 College St., 5th. Fl., Toronto	12	.13	.28	.44	.64	1.04	1.76	0.57	3.0	1.5	25	1
	31002	Univ. of Toronto, Toronto	12	.05	.15	.25	.42	.71	1.36	.037	2.7	1.4	1	Nil
	31003	City Hall, Toronto	12	.06	.15	.25	.42	.71	1.29	0.37	2.6	1.2	1	Nil
	31026	360 Christie, Toronto	6	.04	.13	.22	.40	.78	1.56	0.37	2.7	1.1	1	Nil
	33002	Pharmacy-Hwy. 401, Scarborough	12	.06	.16	.26	.44	.77	1.50	0.39	2.6	1.1	3	Nil
	33003	Lawrence-Kennedy, Scarborough	8	.03	.10	.17	.28	.55	1.07	0.27	2.8	0.9	Nil	Nil
	33019	Redland Cres., Scarborough	12	.03	.09	.16	.24	.45	.91	0.23	1.8	0.7	Nil	Nil
	34002	Science Centre, North York	10	.03	.10	.17	.29	.56	1.06	0.27	2.6	0.9	Nil	Nil
	34007	Bathurst-Wilson, North York	11	.05	.15	.27	.49	.90	1.57	0.43	2.8	1.4	9	Nil
	35003	Rathburn-Renforth, Etobicoke	12	.03	.10	.17	.29	.61	1.22	0.29	2.6	1.4	3	Nil
4	35005	Queensway Hosp., Etobicoke	12	.04	.12	.19	.33	.64	1.23	0.31	2.5	1.3	1	Nil
	35008	22 - 36th St., Etobicoke	12	.03	.08	.15	.24	.52	1.26	0.25	3.2	1.1	2	Nil
	35033	Evans-Arnold, Etobicoke	12	.05	.13	.22	.38	.71	1.59	0.36	3.6	1.6	5	Nil
	35036	Islington-Hwy. 401, Etobicoke	12	.05	.13	.22	.37	.63	1.17	0.33	2.1	1.0	Nil	Nil
	46001	Toronto Airport, Peel County	12	.03	.09	.15	.25	.51	1.16	0.25	1.9	1.3	2	Nil
	46025	Public Library, Mississauga	12	.03	.08	.16	.26	.49	1.07	0.25	2.6	1.2	2	Nil
	46033	Fire Hall, Bramalea	10	.02	.07	.12	.20	.43	.97	0.20	1.8	0.9	Nil	Nil
	46038	Old Court House, Brampton	12	.03	.09	.16	.26	.48	1.00	0.25	1.6	0.8	Nil	Nil
	48001	Hwy. 7-Hwy. 400, York County	10	.03	.08	.15	.25	.54	1.14	0.25	2.1	0.9	Nil	Nil
5	51001	MacDonald Gardens, Ottawa	12	.03	.09	.16	.28	.58	1.15	0.27	2.8	1.2	1	Nil
	52015	797 Princess, Kingston	12	.03	.10	.17	.28	.52	1.07	0.27	2.9	1.2	1	Nil
	56051	Memorial Park, Cornwall	12	.03	.09	.16	.26	.51	1.28	0.26	2.6	1.2	2	Nil
6	63015	1111 Victoria, Thunder Bay	5	.03	.08	.14	.21	.42	.88	0.20	1.4	0.6	Nil	Nil
7	71021	Prov. of Ont. Bldg., Sault Ste. Marie	11	.04	.11	.18	.29	.59	1.21	0.28	2.3	0.8	Nil	Nil
	75018	649 Cassells, North Bay	12	.04	.12	.19	.31	.63	1.30	0.32	3.6	1.0	Nil	Nil

Table 4/1971 – Continued

REGION	STATION NUMBER	LOCATION	NO. OF MONTHS	PERCENTILES						ARITH- METIC MEAN	MAXIMUM		NUMBER OF TIMES ABOVE CRITERIA	
				10	30	50	70	90	99		1-HR.	24-HR.	24-HR.	1-YR.
	75019	Walker's Store, North Bay	5	.03	.08	.14	.21	.42	1.00	0.22	2.0	0.8	Nil	Nil
	75020	Teachers' College, North Bay	6	.02	.07	.13	.19	.35	.74	0.18	1.2	0.5	Nil	Nil
	77016	Ash Street, Sudbury	12	.02	.07	.14	.26	.51	1.18	0.26	4.0	1.1	1	Nil
	77020	50 Cedar St., Sudbury	9	.03	.08	.15	.22	.43	.89	0.22	2.9	0.8	Nil	Nil
	77023	Happy Valley, Falconbridge	8	.02	.06	.11	.20	.39	.82	0.21	5.0	1.1	1	Nil

Table 5/1971 Summary of Data: Total Oxidants (in ppm)

REGION	NUMBER	LOCATION	NO. OF MONTHS	PERCENTILES						ARITH- METIC MEAN	MAXIMUM		NO. OF TIMES ABOVE CRITERIA	
				10	30	50	70	90	99		1-HR.	24-HR.	1-HR.	24-HR.
1	12008	471 University Ave., Windsor	11	.003	.010	.016	.025	.051	.106	.028	.20	.10	80	68
	14049	156 Victoria, Sarnia	12	.007	.015	.022	.032	.056	.119	.033	.20	.09	148	104
	15001	King-Rectory, London	12	.004	.011	.017	.023	.035	.064	.023	.20	.08	17	24
2	29025	Barton-Wentworth, Hamilton	10	.009	.021	.033	.046	.070	.124	.042	.25	.11	178	158
3	31001	67 College St., 5th. Fl., Toronto	11	.001	.004	.006	.009	.017	.037	.010	.07	.04	Nil	3
	34002	Science Centre, North York	6	.004	.012	.021	.032	.052	.081	.030	.16	.06	10	18
	35003	Elmcrest Road, Etobicoke	10	.004	.012	.021	.036	.064	.131	.034	.35	.10	130	61
5	51001	MacDonald Gardens, Ottawa	12	.002	.007	.012	.018	.030	.063	.019	.12	.07	7	21
	56051	Memorial Park, Cornwall	7	.006	.015	.022	.031	.050	.110	.032	.30	.12	34	39
7	77016	Ash St., Sudbury	12	.002	.006	.010	.023	.040	.073	.021	.21	.07	12	34

Table 6/1971 Summary of Data: Nitrogen Oxides (in ppm)

REGION	STATION NUMBER	LOCATION	NO. OF MONTHS	PERCENTILES						ARITH- METIC MEAN	MAXIMUM		NO. OF TIMES ABOVE CRITERIA	
				10	30	50	70	90	99		1-HR.	24-HR.	1-HR.	24-HR.
1	12008	471 University Ave., Windsor	11	.006	.018	.034	.056	.093	.170	.048	.42	.20	23	15
	14049	156 Victoria, Sarnia	12	.003	.009	.016	.026	.045	.088	.025	.19	.09	Nil	Nil
	15001	King-Rectory, London	11	.004	.011	.022	.036	.060	.132	.033	.26	.11	2	1
	16001	Hortic. Station, Simcoe	4	.001	.004	.007	.010	.036	.081	.016	.10	.04	Nil	Nil
3	31001	67 College St., 5th. Fl., Toronto	12	.009	.030	.047	.067	.114	.249	.062	.63	.17	121	24
	33002	Pharmacy-Hwy. 401, Scarborough	8	.004	.012	.026	.044	.089	.196	.042	.37	.17	30	5
	34002	Science Centre, North York	6	.002	.007	.015	.028	.050	.099	.025	.15	.06	Nil	Nil

Table 6/1971 – Continued

REGION	STATION NUMBER	LOCATION	NO. OF MONTHS	PERCENTILES						ARITH-METIC MEAN	MAXIMUM		NO. OF TIMES ABOVE CRITERIA	
				10	30	50	70	90	99		1-HR.	24-HR.	1-HR.	24-HR.
	34007	Bathurst-Wilson, North York	3	.006	.021	.052	.117	.234	.550	.099	.76	.32	164	19
	35003	Elmcrest Road, Etobicoke	5	.012	.037	.062	.104	.216	.391	.096	.57	.29	116	14
5	51001	Macdonald Gardens, Ottawa	9	.004	.012	.022	.038	.070	.152	.035	.34	.11	7	1
	56051	Memorial Park, Cornwall	12	.002	.007	.014	.023	.045	.141	.025	.48	.17	28	3
7	77016	Ash St., Sudbury	11	.002	.006	.010	.017	.030	.068	.018	.17	.06	Nil	Nil

Table 7/1971 Summary of Data: Carbon Monoxide (in ppm)

REGION	STATION NUMBER	LOCATION	NO. OF MONTHS	PERCENTILES						ARITH-METIC MEAN	MAXIMUM		NO. OF TIMES ABOVE CRITERIA		
				10	30	50	70	90	99		1-HR.	24-HR.	1-HR.	8-HR.	24-HR.
1	12008	471 University Ave., Windsor	12	3.4	4.4	5.3	6.1	7.7	11.5	6.0	23	11	Nil	1	17
	14049	156 Victoria, Sarnia	12	0.6	1.8	2.8	3.9	5.8	8.7	3.5	21	7	Nil	Nil	Nil
	15001	King-Rectory, London	2	0.2	0.5	0.9	1.8	3.2	5.4	1.6	14	3	Nil	Nil	Nil
	16001	Hortic. Station, Simcoe	9	0.3	0.8	1.7	2.8	5.8	10.5	2.7	15	10	Nil	Nil	2
2	29025	Barton-Wentworth, Hamilton	12	0.5	1.5	2.5	3.6	6.4	10.6	3.5	20	11	Nil	Nil	7
3	31001	67 College St., 5th. Fl., Toronto	12	0.3	1.0	1.6	2.4	3.8	7.5	2.4	22	8	Nil	Nil	Nil
	31081	67 College St., 1st. Fl., Toronto	12	0.5	1.6	2.7	4.0	6.5	12.9	3.7	21	13	Nil	1	12
	33003	Lawrence-Kennedy, Scarborough	5	2.3	3.9	5.3	7.0	9.9	13.9	6.2	22	11	Nil	1	25
	34002	Science Centre, North York	9	0.4	1.4	2.7	3.9	5.9	8.8	3.4	18	9	Nil	Nil	1
	34007	Bathurst-Wilson, North York	6	0.4	1.5	2.8	5.0	9.9	13.0	4.4	25	14	Nil	1	12
	35003	Elmcrest Road, Etobicoke	12	0.4	1.2	2.2	3.6	6.1	10.4	3.2	15	11	Nil	Nil	4
	35033	Evans-Arnold, Etobicoke	7	3.3	5.6	6.9	8.3	11.1	15.6	7.6	20	16	Nil	7	46
4	48001	Hwy. 7-Hwy. 400, York County	5	0.1	0.4	0.7	1.0	1.9	4.2	1.0	8	4	Nil	Nil	Nil
5	51001	MacDonald Gardens, Ottawa	11	0.2	0.5	0.9	1.5	2.9	7.7	1.6	16	9	Nil	Nil	2
	56051	Memorial Park, Cornwall	11	0.2	0.5	0.8	1.5	3.1	8.5	1.6	15	10	Nil	Nil	1
7	77016	Ash St., Sudbury	5	0.1	0.4	0.7	1.1	2.2	5.0	1.2	10	5	Nil	Nil	Nil

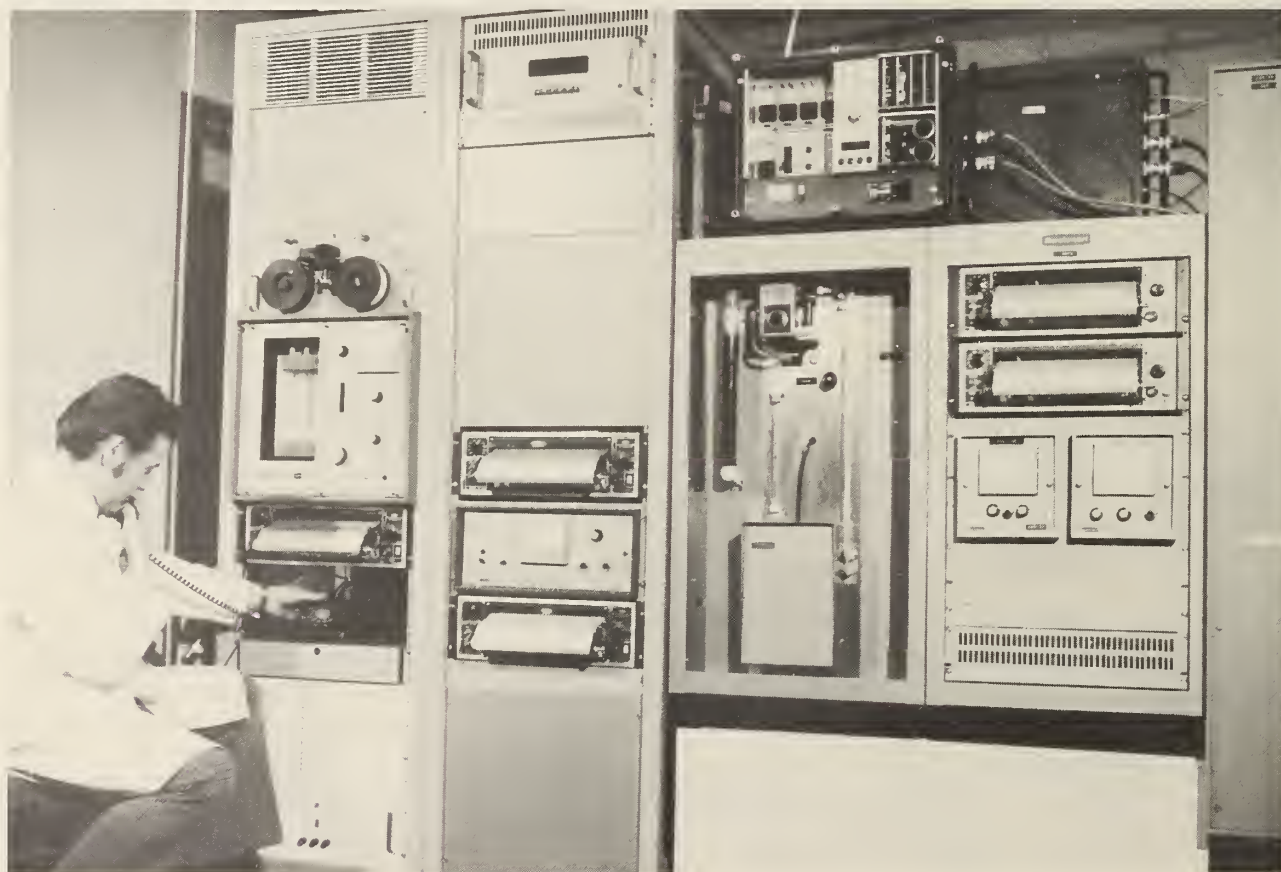
Table 8/1971 Summary of Data: Total Hydrocarbons (in ppm)

REGION	STATION NUMBER	LOCATION	NO. OF MONTHS	PERCENTILES						ARITH-METIC MEAN	MAXIMUM	
				10	30	50	70	90	99		1-HR.	24-HR.
1	12008	471 University Ave., Windsor	12	.88	1.29	1.61	1.94	2.60	4.70	1.8	10.8	6.0

Table 8/1971 — Continued

REGION	STATION NUMBER	LOCATION	NO. OF MONTHS	PERCENTILES						ARITH-METIC MEAN	MAXIMUM	
				10	30	50	70	90	99		1-HR.	24-HR.
	14049	156 Victoria, Sarnia	12	1.59	1.97	2.27	2.64	3.56	6.52	2.5	19.0	5.0
	15001	King-Rectory, London	12	.89	1.24	1.44	1.64	2.09	3.64	1.6	9.4	2.9
	16001	Hortic. Station, Simcoe	2	1.27	1.76	1.96	2.22	2.69	3.65	2.0	4.1	2.9
2	29025	Barton-Wentworth, Hamilton	11	1.06	1.63	2.05	2.49	3.30	5.32	2.2	12.0	5.5
3	31001	67 College St., 5th. Fl., Toronto	12	1.40	1.82	2.13	2.34	2.77	4.01	2.2	8.5	3.6
	31081	67 College St., 1st. Fl., Toronto	12	1.54	1.91	2.14	2.43	3.05	4.34	2.3	7.2	4.0
	33002	Pharmacy-Hwy. 401, Scarborough	11	1.05	1.40	1.66	1.97	2.76	4.78	1.9	6.3	5.1
	33003	Lawrence-Kennedy, Scarborough	8	.96	1.33	1.56	1.84	2.29	4.04	1.7	6.3	3.1
	34002	Science Centre, North York	10	1.07	1.39	1.64	2.12	4.09	7.06	2.2	12.8	5.3
	34007	Bathurst-Wilson, North York	8	1.04	1.43	1.82	.252	3.66	6.22	2.2	8.8	5.6
	35003	Elmcrest Road, Etobicoke	11	1.10	1.37	1.64	2.05	2.63	3.97	1.8	10.6	3.6
	35033	Evans-Arnold, Etobicoke	12	1.01	1.31	1.54	1.81	2.52	4.27	1.7	9.5	5.3
7	77016	Ash St., Sudbury	11	1.08	1.49	1.81	2.20	2.94	4.06	2.0	6.6	4.1

Sophisticated instrumentation continuously measures gaseous pollutants in downtown Toronto (College St.), and transmits data to Air Management's central computer for calculation of the Air Pollution Index.



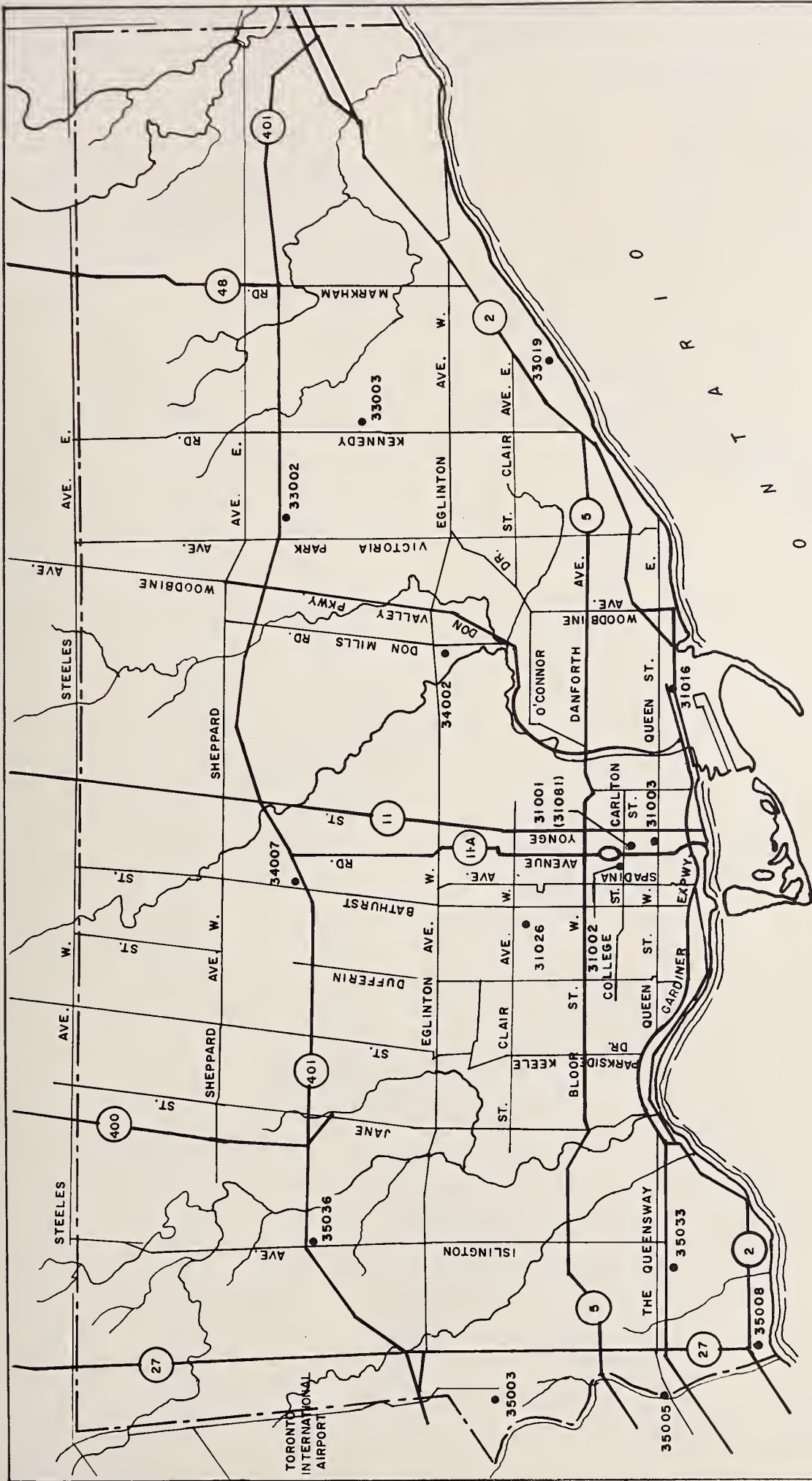


Figure 2 — Locations of Continuous Air Quality Sampling Stations in Metropolitan Toronto.

Figure 3 - Locations of Continuous Air Quality Sampling Stations in Hamilton.

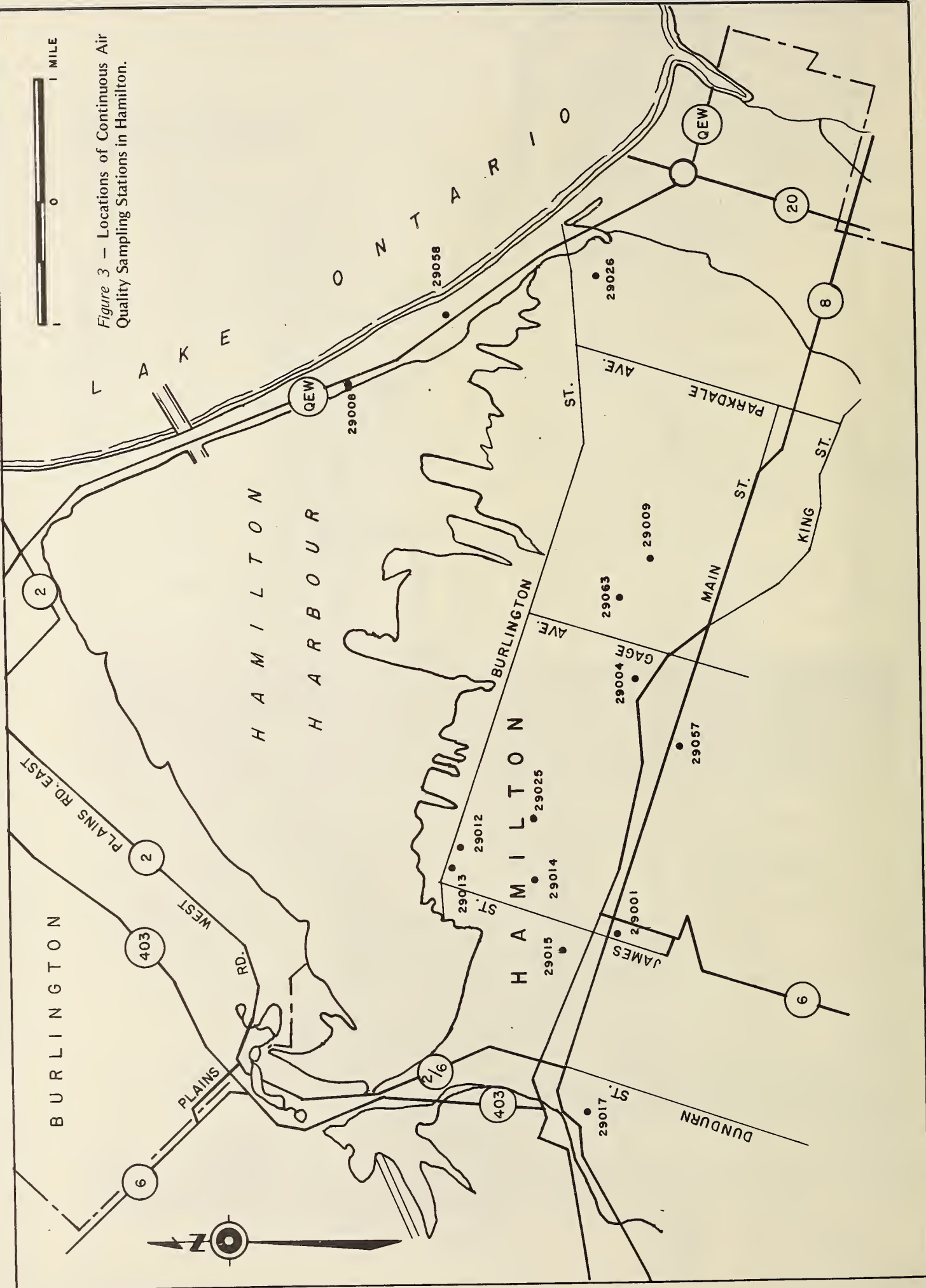
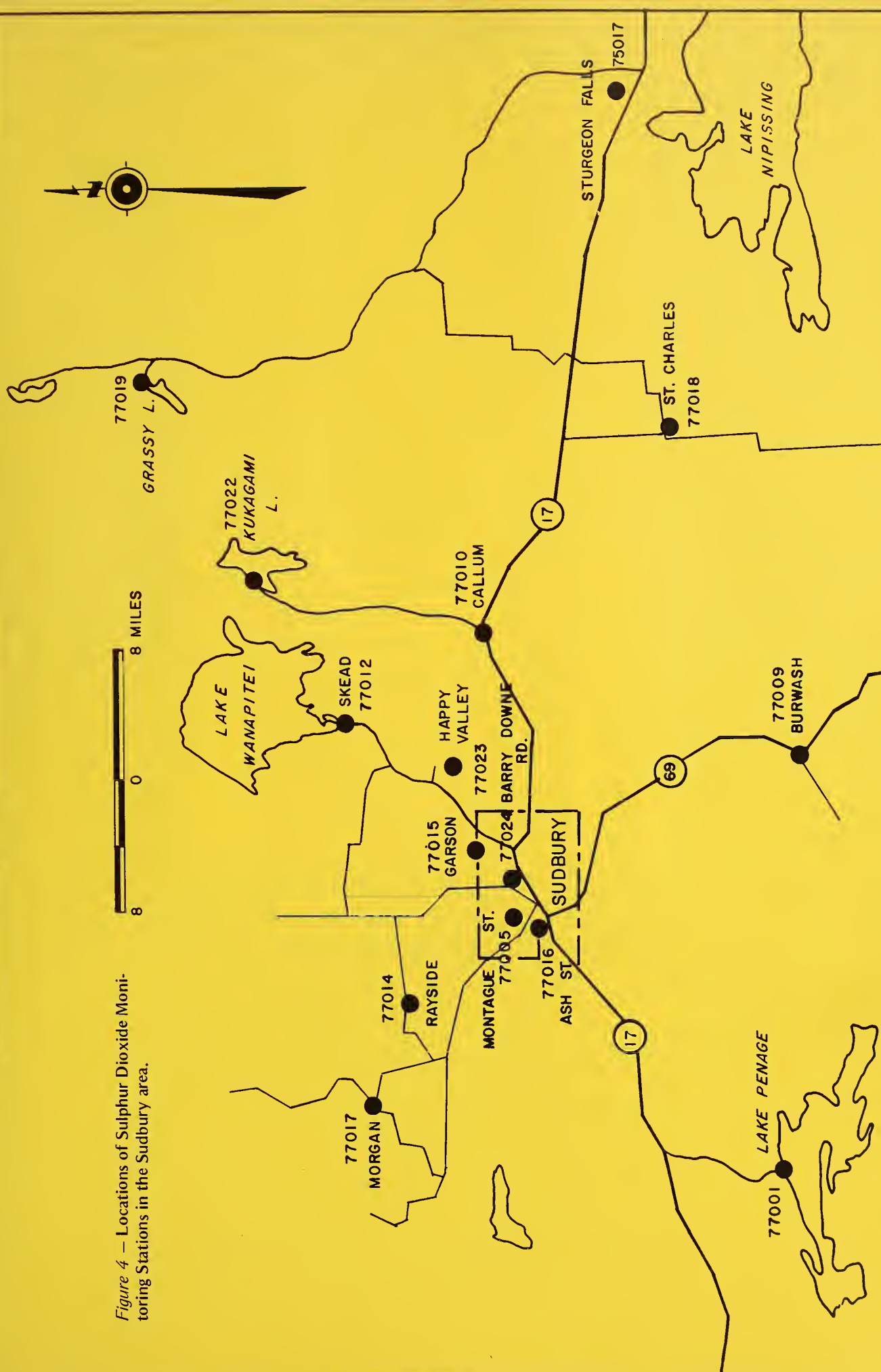
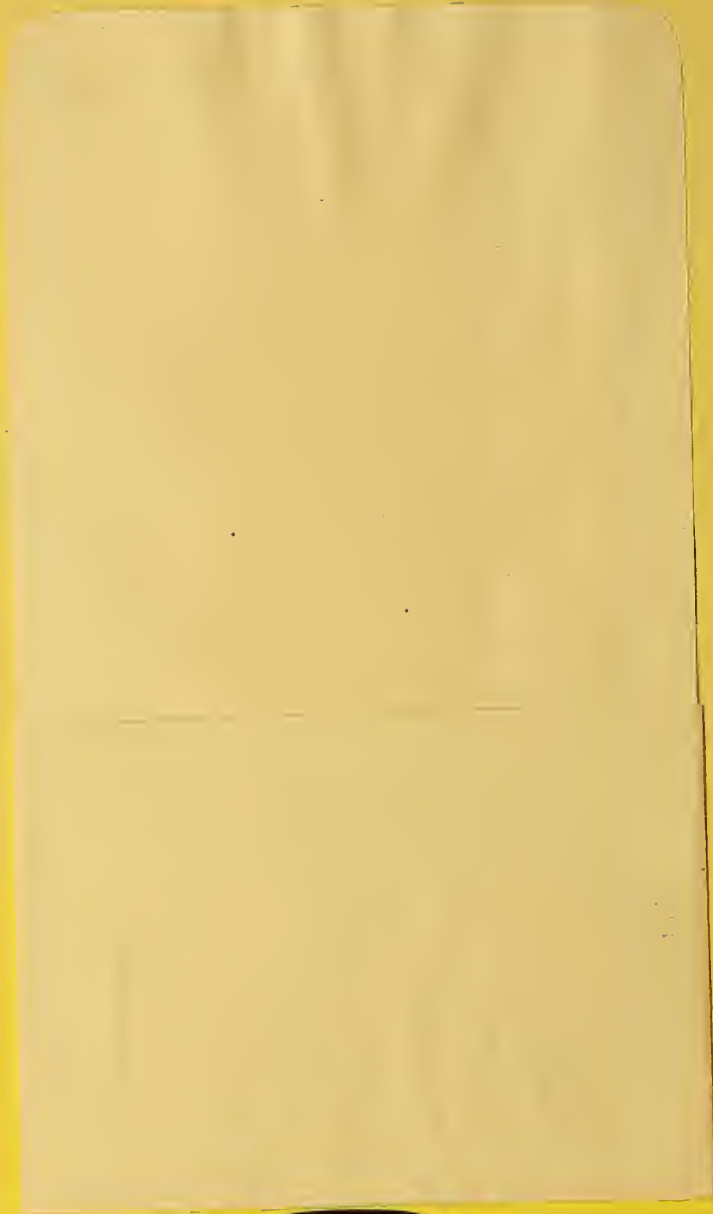


Figure 4 — Locations of Sulphur Dioxide Monitoring Stations in the Sudbury area.





Ontario

Ministry of the Environment

Hon. J.A.C. Auld
Minister

Everett Biggs
Deputy Minister